

REMARKS

This application has been carefully reviewed in light of the Office Action dated March 3, 2004. Claims 8 to 16, 24 to 32 and 34 remain in the application, with Claims 1 to 7, 17 to 23 and 33, the non-elected claims, having been canceled. Claims 8, 15, 24, 31 and 34 are now the independent claims herein. Reconsideration and further examination are respectfully requested.

Applicants wish to thank the Examiner for the indication that Claims 15 and 31 would be allowable if rewritten into independent form. Applicants have chosen to rewrite Claims 15 and 31 into independent form and therefore, Claims 15, 16, 31 and 32 are believed to be allowable.

Claims 8, 10, 13, 14, 24, 26, 29, 30 and 34 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,896,176 (Das). Additionally, Claims 9 and 25 were rejected under 35 U.S.C. § 103(a) over Das in view of U.S. Patent No. 5,523,850 (Kanda), Claims 11 and 27 were rejected under § 103(a) over Das in view of U.S. Patent No. 6,025,879 (Yoneyama), and Claims 12, 16, 28 and 32 were rejected under § 103(a) over Das in view of U.S. Patent No. 6,263,022 (Chen). Reconsideration and withdrawal of the rejections are respectfully requested.

The present invention concerns intra-frame encoding of image signals of a plurality of frames. According to the invention, a discrete wavelet transform is applied to the image signal of each frame and transformed coefficients of each frame are output. Motion detection is performed on an image based on the image signals of plural frames, and a region of the image of the frame is designated based upon the motion detection. The transformed coefficients of each frame are quantized so as to differentiate an image quality of an image of the designated region from other regions, and the quantized image signal is

encoded, wherein, upon encoding of each frame, the transformed coefficients of each frame are independent of pixel values of other frames. As a result, although intra-frame encoding does not require motion detection, the present invention performs motion detection in spite of the intra-frame encoding so that a region of interest of a frame can be encoded with a higher quality than other regions of the frame.

Referring specifically to the claims, amended independent Claim 8 is an image encoding apparatus for performing intra-frame encoding of image signals of a plurality of frames, comprising input means for inputting an image signal including pixel values of a frame, transformation means for applying a discrete wavelet transform to the image signal of each frame and outputting transformed coefficients of each frame, motion detection means for detecting motion of an image based upon the image signals of plural frames, region designation means for designating a region of the image of the frame based upon information indicating motion of the image detected by the motion detection means, quantization means for quantizing the transformed coefficients of each frame so as to differentiate an image quality of an image of the region designated by the region designation means from an image of other regions, and outputting a quantized image signal, and encoding means for encoding the quantized image signal quantized by the quantization means, wherein, upon encoding of each frame, the transformed coefficients of each frame are independent of pixel values of other frames.

Amended independent Claims 24 and 34 are method and storage-medium claims, respectively, that substantially correspond to Claim 8.

The applied art, alone or in any permissible combination, is not seen to disclose or to suggest the features of Claims 8, 24 and 34, and in particular, is not seen to disclose or to suggest at least the feature of performing intra-frame encoding of image

signals of a plurality of frames by detecting motion of an image based upon the image signals of plural frames, designating a region of the image of the frame based upon the detected motion, quantizing transformed coefficients of each frame so as to differentiate an image quality of an image of the designated region from an image of other regions, and encoding the quantized image signal such that the transformed coefficients of each frame are independent of pixel values of other frames.

Das is merely seen to disclose a process for performing inter-frame encoding whereby motion is detected between a frame F_N and a reconstructed frame F_{N-1} . A region of the frame F_N is segmented into sub-regions, quantized, and encoded so as to obtain the inter-frame encoding between the frame F_N and the reconstructed frame F_{N-1} . In performing the encoding, corresponding pixel values are used between the frames F_N and F_{N-1} . Thus, Das is not seen to disclose or to suggest the foregoing features of the present invention.

Kanda, Yoneyama and Chen are not seen to add anything that, when combined with Das, would have made up for the deficiencies of Das. In particular, Kanda, Yoneyama and Chen are not seen to disclose anything that, when combined with Das, would have resulted in performing intra-frame encoding of image signals of a plurality of frames by detecting motion of an image based upon the image signals of plural frames, designating a region of the image of the frame based upon the detected motion, quantizing transformed coefficients of each frame so as to differentiate an image quality of an image of the designated region from an image of other regions, and encoding the quantized image signal such that the transformed coefficients of each frame are independent of pixel values of other frames.

In view of the foregoing deficiencies of the applied art, all of Claims 8 to 16, 24 to 32 and 34 are believed to be allowable.

No other matters having been raised, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



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